THE TREATMENT OF CHRONIC STENOSIS OF THE LARYNX AND TRACHEA.

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IN a previous article upon this subject[1] a plan of treatment which seemed capable of success was given in detail, and 23 illustrative cases were described. As enough time had not then elapsed to make the results conclusive, and as now all the patients who were then living have recovered, it seems proper to review the procedures by which success was obtained. In those 23 cases at the time of the last report, there had been 3 deaths and 2 failures to cure; the misfortunes I think were largely dependent upon my inexperience. All of the remaining 18 patients are practically well, and all but one have good or perfect voices. Two, however, of these 18 are still wearing intubation tubes. One of them is a practising physician, who has acquired the somewhat remarkable accomplishment of intubating and extubating himself, and cannot be induced to wear the tube continuously and long enough permanently to cure his cicatrix, which at constantly longer intervals shows signs of recontraction, and from time to time requires some dilatation. The second patient has a cicatrix just below the vocal cords, and though a trial has shown that it will not now shrink enough appreciably to obstruct respiration, it interferes so much with the cords as to permit only whispering speech, to overcome which disability its complete obliteration by pressure is being attempted. With these two exceptions a practically perfect result can be announced for 18 out of the total of 23 patients.

The causes of obstruction in the larynx or trachea may be briefly recapitulated as follows: (1) Obstruction or compression of the respiratory tract by neoplasms, of which the papillomas are the most common, and exuberant granulations rare. (2) Cicatrices of traumatic, operative, or inflammatory origin. (3) Hypertrophic subglottic laryngitis. (4) Atrophy (of disuse) of the laryngeal abductors in "retained tubes" and tracheal cannula cases. (5) Other less common causes of obstruction might be cited, but there is no necessity of multiplying the classification, as the cases must evidently be either entirely irremediable or else possible of treatment by operation or a combination of the operation and subsequent dilatation methods here advocated.

This work was begun with the object of relieving some apparently hopeless cases of retained intubation tubes and tracheal cannulæ which were sequels of diphtheria, and with the experience thus gained was extended to the treatment of the more strictly surgical conditions of fibrous strictures and of neoplasms. Hence this order will be more or less followed below, as it showed the way to overcome many obscure difficulties and dangers.

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Statistics have demonstrated that about 1 per cent. of the patients intubated for laryngeal diphtheria will subsequently be unable for an indefinite period to breathe without the assistance of the tube or a tracheotomy. As such cases are at the best (or worst) not numerous, and as autopsies are often not obtained, the true pathology of the condition is not generally recognized or is disputed.

In my previous article there were cited in detail 15 cases of "retained tube" following laryngeal diphtheria. In this group there were 3 autopsies, and in addition the larynx and trachea of 5 cases were carefully inspected by thyrotomies and tracheotomies. In these 8 patients the pathological condition was thus verified by sight and touch, and in 3 of them was studied under the microscope and found to be a chronic hypertrophic laryngitis, a combination of an exudative and productive inflammation causing a vascular, œdematous thickening of all the intralaryngeal soft parts sufficient to occlude completely the respiratory tract from the false cords to the lower border of the cricoid cartilage or the first or second ring of the trachea. In the other 7 cases the clinical picture was so similar, as was also the sensation communicated to the operator's hand during intubation, that there can be no reasonable doubt of the chief primary cause of obstruction in these patients, all of whom had to be intubated for laryngeal diphtheria, and thereafter could not breath without the instrument. Ulceration and cicatrices may develop at the same time or later (generally as the result of tracheotomy or other operation), but a cicatrix as the original source of obstruction after diphtheria only occurred twice in my cases, and then the diagnosis was doubtful. Exuberant granulations as a cause of obstruction occurred but once in the postdiphtheritic cases, and then were secondary to an intubation for hypertrophic laryngitis. Spasm or cramp of the adductors simulating an hypertrophic laryngitis occurred three times.

In considering the reasons for the stenosis in these retained tube cases following diphtheria the above experience may be considered a fair example of the average: hypertrophic laryngitis, spasm of the adductors, cicatrices, and exuberant granulations occur in about this order of frequency; the difficulty in the great majority of cases is, however, a chronic exudative and productive inflammation of the intralaryngeal soft parts; in other words, a chronic hypertrophic subglottic laryngitis. The condition was recognized long before the invention of intubation, when tracheotomy was the only remedy possible for severe croup, and hence it is not fair to ascribe it to faulty technique in the "tubage." The chronic thickening may have something to do with traumatism inherent in wearing a tube, but the individual operator should not be held responsible for what is properly a danger inseparable from a life-saving procedure; and this danger is comparatively slight when one considers that it only occurs in about 1 per cent of the cases.

What I have called "adductor spasm" as a cause of stenosis is not generally recognized, but is a condition of serious moment in patients who have worn a tube for a long period of time. This instrument, particularly the "special" tube recommended below, places the abductors or openers of the larynx entirely at rest for weeks or months, while with every effort in coughing or clearing the throat the adductors are brought into use; thus one set of muscles, the closeers of the larynx, should, theroetically at least, hypertrophy, and the other set, or openers, atrophy. I have never been able to verify the condition by autopsy, but the treatment necessary to overcome it corresponds so exactly with the hypothesis that I have no doubt of the accuracy of the description, and unless it is borne in mind some of these cases will be given up as hopeless instances of intralaryngeal hypertrophy or abductor paralysis, or what not, and condemned to a permanent tracheotomy. Localized obstructing paralysis may be possible, but from a study of the literature and from observation in a considerable experience I believe it must be extremely rare.

The differential diagnosis of the causes which may necessitate the retention of an intubation tube (or a tracheal cannula) after laryngeal diphtheria for weeks or months is not difficult. The common hypertrophic laryngitis usually produces complete obstruction, which is manifest immediately or very rapidly after the removal of the artificial aid to respiration. A cicatrix, on the other hand, does not immediately occlude the lumen of the passage when the dilating instrument is removed, but it contracts gradually in the course of days; and more distinctive still is its resistance to instrumentation. The soft œdematous tissues of an hypertrophic laryngitis require no force in the passage of the proper sized tube or urethral sound, while for the introduction of an instrument through a fibrous structure some pressure has to be exerted. Furthermore, the frequently dangerous accident of auto-extubation, especially when it occurs repeatedly and without apparent provocation, generally accompanies hypertrophic laryngitis, and seems to be largely caused by it. It often occurs in the presence of both hypertrophic and cicatricial stenosis, but very rarely when the condition is purely cicatricial.

During the manipulations exuberant granulations, which are very seldom the true cause of the obstruction, should be seen or felt; they can be generally found around a tracheal fistula or at the upper or lower end of a tube or cannula, and should reveal their presence by difficulty in inspiration rather than expiration or in the reverse state of affairs. They are friable and bleed easily, and if ordinary care is employed cannot readily be overlooked.